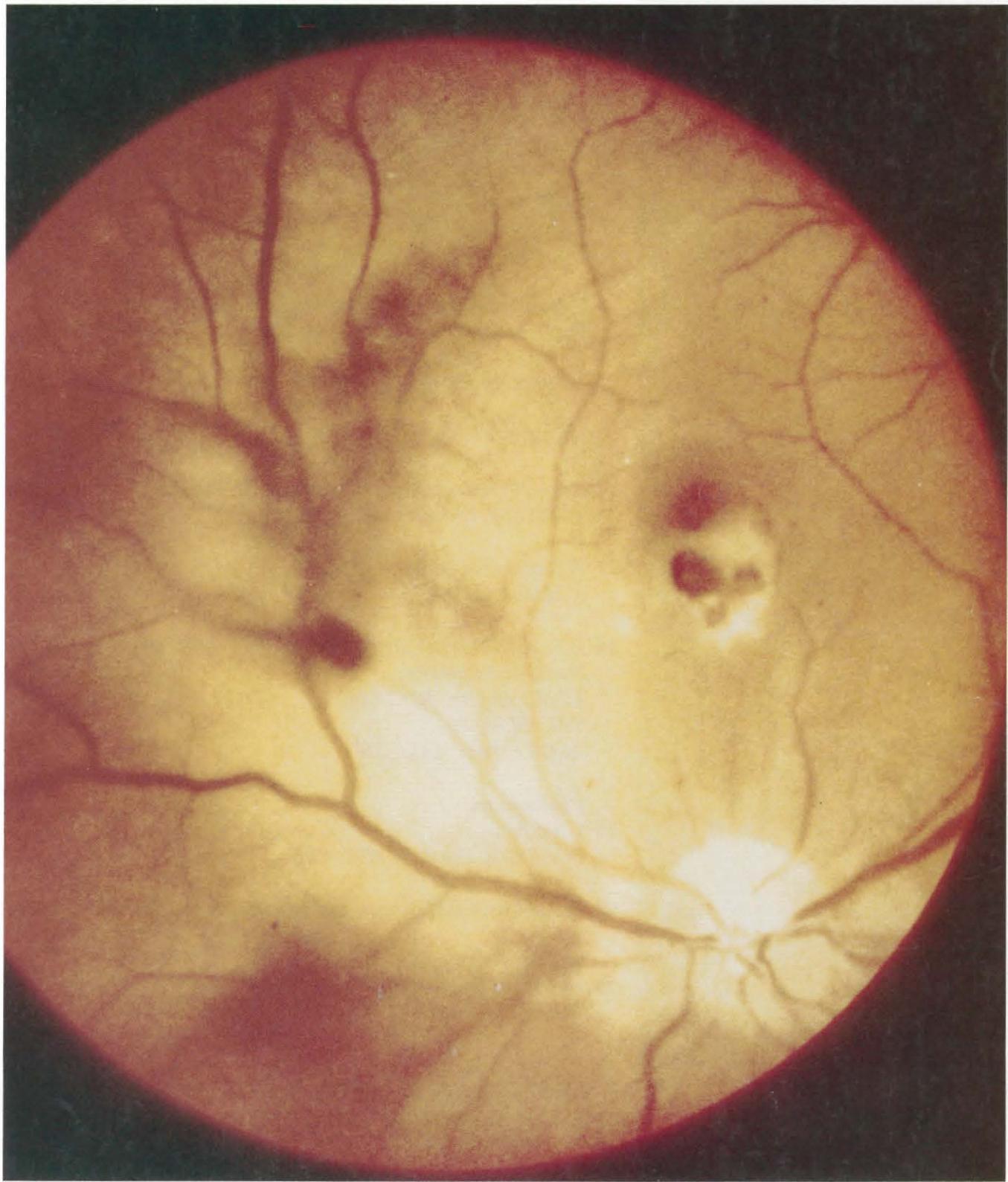


NAVY MEDICINE

March-April 1996



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COVER: Improper use of a laser range finder caused serious damage to this eye (orientation: left side is top of eye). See story on page 23.



After meeting for the first time, Kris Sorenson and the bone marrow recipient, Sarah Gibler, stand with Illinois State Assemblyman David Leetch.

A New Lease on Life

Kris Sorenson

In the summer of 1993, I responded, on a whim, to a bone marrow drive at the Naval Medical Center San Diego, CA, where I work as a budget analyst. I used to donate blood frequently, and this other kind of donation seemed like the thing to do. They took but a tube or so of blood, had me fill out some paperwork, and review materials about the program.

In late March of 1994, I was notified by the Department of Defense's C.W. Bill Young Marrow Donor Program, that I was a preliminary genetic match for a potential recipient. Would I seriously consider donating marrow if I turned out to be an actual match? I was absolutely thrilled at the prospect. The idea that I might be able to save another life seemed incredible to me. I responded by saying I would be delighted to be a donor. They informed me the odds of being a preliminary match were 1 in 10 and that the odds were possibly 1 in 10,000 of being an actual match. In other words, I shouldn't get too excited just yet.

I sent some more blood samples to them through the Naval Medical Center blood bank, with the understanding it would take further tests to see whether I would move on to the next stage of becoming a marrow donor. I waited on pins and needles, feeling the whole time that this was something I was being called to do. Finally, in early May 1994 I received a call from the DOD bone marrow program. I was indeed an ideal match for a cancer patient, and would I still be interested in following through? My answer was unequivocal. I felt as though I just won the lottery and could barely contain my excitement! The actual transplant would take place on 9 June 1994.

The DOD bone marrow program then sent a letter to the

Commander at the Naval Medical Center informing him about the contribution I was about to make, and that I would need a few days of administrative leave. That letter came to me through the chain of command, in each case enthusiastically endorsed from Commander all the way down to Comptroller. Once the Commander signed a release form, I was able to obtain permissive orders. The DOD bone marrow program handled all the rest.

All together, I had 4 days, not counting the weekend. The donation procedure was on a Friday. The DOD program sends all its donors to Georgetown University Medical Center in Washington, DC. I could not have been more excited (and a bit nervous as well) because this was unexplored territory for me. I was about to undergo a medical procedure that required general anesthesia. Yet I reminded myself that my worst moments during this procedure were probably better than the patient's best moments with cancer. In addition, I would fully recover a couple of weeks later, with no lasting effects.

One uncanny feeling that this was like being pregnant stayed with me during the time leading up to the donation. I suddenly felt that whatever I did I was doing for two people. I felt a need to take extra care of myself, to drive a bit more carefully, to ensure that I stayed healthy. If anything happened to me, there would be two victims!

There was high irony to this story as well. My mother died of cancer at age 37 in 1973. She could possibly have benefited from a bone marrow transplant in the early stages of the disease had that technology existed in the late 60's. At age 37 I was now donating to a cancer patient! And shortly after the transplant, that patient turned 37.

Because I'm not married, a very dear friend, Mary Ann Lovi, accompanied me to Washington. She was a tremendous help and support during my stay.

The donation itself went very smoothly. Naturally, I had some butterflies just before undergoing the procedure. But my excitement never waned at the prospect of helping save another life. One memory I have of the procedure is seeing a nurse standing near me in the pre-op room, clad head-to-toe in sterile clothing, holding an igloo-type container. An ambulance, I knew, was awaiting the marrow as soon as it was harvested, to be rushed to a waiting jet, which would then fly it to an airport with another waiting ambulance, which would then rush it to a medical center, I knew not where, to a cancer patient, I knew not who. I knew only that the patient was a 36-year-old female with a rare form of "pre-leukemia."

The hospital kept me overnight for observation to ensure I didn't have an allergic reaction to the anesthetic. I felt a bit ill for a few hours as I recovered from the anesthesia, but by evening Mary Ann and I were enjoying a sumptuous dinner of steak and lobster provided by the program.

When I was discharged from the hospital, I played the tourist, sightseeing all over Washington. There was some swelling at the harvest site, I tired easily, and I felt some pain and discomfort for several days, but pain pills were unnecessary. I found the pain—it even seems too extreme to call it "pain"—was very easy to deal with, and I felt very proud of what I did feel. I wore it like a badge of honor.

The transplant itself, I've been told, is almost anticlimactic. After all the excitement, the anticipation, the preparation for the procedure, and the wondering if I would truly follow through, the procedure itself consists in little more than allowing the bone marrow to drip slowly into the patient's bloodstream through a special IV. Yet it must be an incredible feeling for the patient to know that in that marrow could be a new lease on life.

Prior to the transplant, the patient undergoes complete irradiation of their bone marrow. He or she is brought literally to death's door, devoid of immunity, and completely dependent on medical help until the new marrow arrives. Post-transplant is a very difficult time. Strong anti-rejection drugs and other medications are required. The recipient is literally starting life anew, and the odds of long-term survival are 50/50. Several medical staffers told me that even when recipients know they are about to die, they always express tremendous gratitude for the gift, knowing they at least had another chance at life. So now, all we could do is wait . . . and pray.

The transplant took place at the University of Iowa

Medical Center in Iowa City. The recipient, I would only find out a year later, was Mrs. Sarah Gibler of Toulon, IL. Sarah, whose husband's name is Jim, has one grown daughter, who had just given Sarah her first grandchild. Sarah and I were able to correspond anonymously through the bone marrow program for a year. I didn't realize that our correspondence would break all records at the University of Iowa Medical Center transplant program!

Sarah is now on the road to full recovery, having survived her first year. I consider her the real hero of this story. Not only did she face a deadly disease, she also fought a successful battle against the Medicaid's archaic rules against funding donor searches through the bone marrow registry. Indeed, her plight drew the attention of the media and local politicians who helped reverse the Medicaid rules. This change has already benefited other transplant patients.

Due to the publicity, extraordinary circumstances surrounding her case involving powerful politicians, and her remarkable rate of recovery, the University of Iowa Medical Center decided to hold a rare news conference so that Sarah (and her family) and I could meet for the first time. It was an emotional and thrilling event that everyone associated with it will remember for a lifetime. Besides copious local coverage, the San Diego CBS affiliate aired the story. Fortunately, the coverage bolstered bone marrow drives in both areas. Sarah and I still correspond regularly. I'm considered an adopted part of her family, and the feeling is mutual. I hope to have a "reunion" sometime with both sets of families.

I still cannot quite fully embrace the reality of this situation. There's a certain dreamlike quality about it. Be that as it may, I have resolved to use my public speaking skills to promote the bone marrow program wherever and whenever I can. I talked to prospective registrants at the very popular NAS Miramar Air Show all weekend in August 1995, and I show up at bone marrow drives whenever I can.

As flattering as all this attention has been, I have tried not to lose sight that the publicity serves a purpose. I believe it is meant to educate, inform, and inspire others to follow in my footsteps. I only wish many more could encounter what I have experienced, namely, the intense joy and fulfillment of saving another's life. And with it all, I believe I've tasted a bit of what Heaven must be like.

For DOD's C.W. Bill Young Donor Program, call 1-800-MARROW 3. □

Mr. Sorenson is a budget analyst at Naval Medical Center San Diego, CA.

Variation in Practice Patterns Within Staff Sick Call

Part 2: Management Under Capitation

CAPT James W. Allen, MC, USN
LCDR Richard Blumling, NC, USN

A systematic assessment of variation in the medical content of a clinic visit allows providers and administrators to develop adoptive strategies for the managed care environment. In this two-part series we report on an assessment of medical content of clinic visits conducted at the staff sick call (SSC), Naval Medical Center, Portsmouth, VA. Part 1, published last month, describes common diagnoses and overall practice patterns. Part 2 examines the specific medical content of clinic visits for three diagnoses. Our objective is to convince primary care providers that they can adjust the content of patient encounters just as their hospital-based colleges alter the content of inpatient care. The diagnoses we examine illustrate the impact of different clinic situations on medical content.

Methods and Materials

The data collection process for our study begins with a questionnaire at-

tached to the chart of each patient who entered the SSC from 24 Sept 1994 to 10 March 1995. The questionnaire has six paragraphs. The first allows the staff to enter basic demographic information, while the second allows the provider to check the primary diagnoses from a list of frequent diagnoses. Important data items from the first two paragraphs are the visit type, either initial or followup; provider number assigned to the treating provider; and diagnoses coded in the ICD-9 format.

The next four paragraphs identify the specific medical content and disposition of the visit. Providers make selections by checking the category listed under each paragraph. Diagnostic Screening Services used during the visits, paragraph 3, provides twenty selections for items such as laboratory tests, X-ray services, and physiologic measures. Therapeutic Services, paragraph 4, offers seventeen selections involving patient counseling and education. Paragraph 5

presents 19 classes of medications prescribed. The final paragraph has eight selections describing disposition. These four paragraphs permit convenient display of medical content in a format called the Resources Usage Sheet (RUS). Under each of the four paragraphs are the specific selections which the RUS displays as a percentage of visits that received the service. The RUS is a summary of the medical content offered by providers in SSC for a specific diagnosis.

During the 5-month study we collected 3,410 questionnaires. After reviewing each for completeness we sent them to the Naval Health Research Center, San Diego, CA, for computer data entry. Analysis of the data used the statistical program STATA. The size of our data base permits development of a RUS for the most frequent diagnoses seen in SSC.

Effect of Guidelines

Measuring variation in medical content assumes the availability of a

Category	Standard	Initial	Followup
Diagnostic Services: Blood pressure No diagnostic services	+	76% 20	77% 16
Therapeutic Services: Other counseling Other therapy No services	+	16 12 60	50 0 33
Medications: Steroid cream Other drugs Antibiotic Antifungal NSAID No medication	+ (*) + (*)	44 4 8 8 4 32	33 16 0 0 0 50
		n = 25	6

*Optional for initial visit

Source: BUPERSINST 1000.22 PERS-23, 12 Feb 1993

Figure 1. Resource Usage Summary for Pseudofolliculitis Barbae (704.8), Initial and Followup Visits, Compared With Standard

treatment protocol for comparison. For the vast majority of diseases treated at SSC no protocol exists. Fortunately, two standard protocols, or treatment guidelines, are available. One is for pseudofolliculitis barbae (PFB) and the second is for low back pain (LBP), both frequent diagnoses (see Table 2, Part 1). They illustrate the effects of guidelines on the medical content of patient encounters.

To issue a "no shave" chit, providers diagnose and treat PFB as outlined in BUPERSINST 1000.22 PERS-23. For the initial visit the guideline specifies patient counseling on the disease process and the administration of the chit, patient education on shaving technique, and a steroid cream depending on the severity of the condition. For the followup visits the guidelines continue the initial treatment with addition of a steroid cream and depilatory.

Do providers at SSC conform to this treatment protocol? To answer this question we identified 25 patients in our data base who had initial visits to SSC for PFB. The RUS displays the medical content of these visits compared to the guideline (Figure 1).

A general concordance exists between the medical content and guideline. Patient counseling under the Therapeutic Services paragraph is lower than expected but steroid creams are the predominate medication prescribed. Concordance is nearly exact when considering the six patients returning for followup visits. PFB provides a fortuitous example illustrating the compliance of SSC providers to a specific guideline when the patient desires a specific outcome, the "no shave" chit. The existence of a well published, clinically relevant guideline invites providers' conformance.

LBP is the second diagnosis with a definite guideline for comparison. Clinical Guideline 14 from the Agency for Health Care Policy Research outlines the recommended resource usage for patients presenting with LBP. After screening the patient for fractures, back tumors, and cauda equina syndrome, Guideline 14 recommends limited bed rest, counseling on lifting techniques, physiotherapy, and exercise as appropriate with a short course of either a NSAID or muscle relaxant. Emphasis is on both counseling pa-

tients and returning them to work in a limited duty capacity. LBP is a self-limited condition bound to reoccur if patients do not understand body mechanics.

How do providers conform to Guideline 14 had it been available during the study period? The RUS summarizes the medical content of 137 patients presenting with LBP on initial visit (Figure 2). Most striking are that 15 percent of patients received X-rays, which is not part of the guideline, only 27.0 percent received exercise counseling which all patients should have received, medication for both NSAID and muscle relaxants are both prescribed for 53 patients (39 percent), and disposition for 18 percent of visits was to a specialty clinic. Our study presents no information on the appropriateness of the therapies prescribed; rather, the RUS illustrates the variation in actual medical content of the clinic visits from a clinic guideline that could now be implemented in SSC.

Diagnoses Without Guidelines

The most frequent disease category seen in SSC is acute respiratory disease with nasopharyngitis, the most frequent diagnoses in that category (see Table 2, Part 1). No clinical guidelines are available for this disease. The aggregate analysis described in Part 1 illustrates that general medical officers (GMOs) use significantly less antibiotics than do interns or independent duty corpsmen (IDC) in the treatment of nasopharyngitis.

What is the medical content of initial visits for this diagnosis, and does the medical content of visits to a GMO differ from the content of other providers? The RUS for nasopharyngitis answers both these questions (Figure 3) for 273 patient visits separated into categories for GMOs, in-

terns, IDC's, and IDC trainees. The medical content shows a wide range of medications prescribed, few therapeutic and diagnostic services used, and disposition that usually involved no followup care. For the GMO who treated 96 patients, the medical content shows significantly less antibiotic usage ($p=0.0097$) than the other providers. The difference in medical content between interns who treated 135 patients and IDCs who treated 42 patients is that the latter used more antihistamine, NSAIDS, and allergy relief medications. Other than the use of antibiotics the pattern of care for all categories of providers shows the use of a large number of medications and dispositions. A treatment protocol may help the non-GMO providers reduce their use of antibiotics and help all providers better focus the content of their clinic visits for acute nasopharyngitis.

Enhancing Medical Content

The diagnosis-specific analysis of variation both reinforces a conclusion reached in the aggregate analysis and highlights two tools useful in influencing the medical content of patient encounters. For a variety of diseases the RUS shows low use of therapeutic services as compared to medications. This observation reinforces the same conclusion reached in Part 1. The medical content of visits to SSC is deficient in preventive and health promotion strategies. Providers must include in their patient encounters more self-care counseling rather than depend solely on prescription medications for treatment.

Providers can actively change the medical content of patient encounters. One tool to use is the practice guideline. Existence of a well-conceived guideline, as in the case of PFB, is likely to increase conformance, while lack of a guideline, as in

Category	Standard	SSC (%)
Diagnostic Services:		
Blood pressure	+	75%
Urinalysis	-	2
Other X-rays	-	15
Other lab	-	0
Other tests	-	1
No diagnostic services		13
Therapeutic Services:		
Diet	+	2
Exercise	+	27
Other counseling	+	10
Physiotherapy	+	3
Other therapy	-	4
No therapy	-	45
Medications:		
No medication	-	10
NSAID	+	81*
Muscle relaxants	+/-	40*
Antiemetics	-	1
Antacids	-	2
Decongestants	-	1
Disposition:		
No followup	-	29
Return	+	23
Sick in quarters	+/-	20
Specialty clinic	-	18
Return to station	+	1
Others	+	7
		n = 137

*53 patients had combined drug therapy

Source: AHCPR Clinical Practice Guidelines, No. 14

Figure 2. Resource Usage Summary for Acute Low Back Pain (724.2/724.4)
Compared With Standard, Initial Visits

the case of nasopharyngitis, results in wide variation in resource usage. Patient mix, specialty of providers, and payment mechanism all account for variation in resource usage.(1) Of these three variables only specialty, interpreted as education level, is applicable to our study. Data from the RUS illustrates that guidelines invite conformance by the interns, IDCs, and GMOs at SSC.

An argument against the use of guidelines is that quality of care (QOC) will suffer. Although the SSC study does not address outcomes, review of the literature does not agree with that argument. A retrospective study among 135 providers in an ambulatory setting shows that QOC provided for common conditions encountered in primary care is not associated with

the costs generated by the provider.(2,3) With this finding providers in the military setting should not be deterred from implementing guidelines because of arguments about QOC.

The second tool to influence change in medical content is information feedback to individual providers. Feedback, education, participation, and administrative interventions are available techniques to change providers' decision making.(4) The value of information feedback becomes apparent when we give individual providers the RUS for diagnoses they treat. These providers appreciated viewing their individual practice patterns. From this experience we generate the hypothesis that information feedback using the RUS is of value to

Category	GMO	Interns	IDC
Diagnostic Services:			
Blood pressure	78	73%	81%
Urinalysis	1	1	2
Chest X-ray	1	0	2
Other X-ray	1	0	0
Strep throat culture	5	7	7
HIV serology	0	1	0
Other labs	1	1	0
Other diagnostics	1	2	0
No diagnostic services	7	16	12
Therapeutic Services:			
Diet	1	4	43
Exercise	1	0	0
Smoking	4	4	2
Other counseling	2	3	14
Other therapy	0	0	2
No therapeutics	78	74	33
Medications:			
No medication	6	6	5
Antibiotic	4*	13	14
Antiemetics	1	3	2
Antihistamine	19	17	36
Antiviral	0	7	0
NSAID	34	20	52
Allergy relief	0	1	10
Cough silencer	32	19	10
Decongestants	71	56	69
Steroids	1	1	5
Other drugs	0	2	0
Disposition:			
No followup	48	51	50
Return	10	18	14
Sick in quarters	25	30	29
Telephone followup	1	2	2
Specialty clinic	4	0	0
Others	4	5	0
	n = 96	135	42

*Means a significant difference

Source: No guidelines

Figure 3. Resource Usage Summary for Acute Nasopharyngitis Common Cold (ICD-9 Code 460), Initial Visits, Separated by Categories of Providers

SSC providers who desire to improve the medical content of their patient encounters.

Information feedback is difficult without an automated system. One large multispecialty group uses automation to adjust for age and co-morbidity in the information fed back to providers.(5) Controlling for age and co-morbidity enhances comparison of resource usage among different panels of patients. While sophisticated systems may become available, the Defense Department's Ambulatory Data System (ADS) is in alpha testing at the Naval Medical Center, Portsmouth. Data items in ADS(6) are

similar to those in the study questionnaire. Another recommendation we have is to include information feedback of the type presented in this study in the final design of ADS.

Task Actions for Primary Care Providers

Every ambulatory visit represents an opportunity to develop a medical content that meets the patient's needs. Medical content is measurable and includes diagnostic services, therapeutic activities, medications, and dispositions. For the three diseases presented, the RUS illustrates medical content under circumstances of

differing provider education and guideline availability. Variability of medical content decreases when guidelines are available.

Costliness of the patient encounter is an important difference between the ideal and the flawed visit. The managed care environment demands the best QOC for the least cost. The action items for primary care providers are to determine the medical content of their most frequent diagnoses, examine that content for appropriateness, and then recommend appropriate medical content to other providers. Following this plan of action will result in patient encounters having less variability in resource usage, thereby more competitive in today's managed care environment.

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CAPT Allen has available the questionnaire, data base, and software used in the SSC study. Other providers interested in an epidemiologic oversight of their clinics should contact him at ALLEN@usuhsb.usuhs.mil.

Dr. Allen is a resident in occupational medicine at the Uniformed Services University of the Health Sciences, Bethesda, MD. LCDR Blumling is an emergency nurse and is completing an MS as a family nurse practitioner.



CDR Tom Richie, MC, USNR, studies malaria occurring among villagers in a remote region of Indonesia.

NAMRU-2 in Action

Sailors and marines deployed to the tropics in conflict or in peace face an array of infectious disease threats now uncommon in the United States. Malaria, dengue fever, cholera, and a number of other bugs can ruin an otherwise great liberty but, worse, could change a unit's ability to complete their mission if a number of its personnel were affected. Photographed here are researchers from a critical Navy outpost in the war against these and other military-important infectious diseases, the Navy Medical Research Unit No. 2 (NAMRU-2), based in Jakarta, capital of the Republic of Indonesia.

NAMRU-2's mission is to conduct a coordinated research effort to improve prevention, diagnosis, and treatment of infectious diseases of mission compromising potential for U.S. forces deployed in the tropics. The only way to study these diseases is to meet them on their own ground in the tropics, working with host governments and people who are still struggling to combat these health prob-

lems. NAMRU-2 researchers travel extensively throughout the 16,000-island Indonesian archipelago and other field sites in Southeast Asia, often placing themselves at risk for the very illnesses they study as well as enduring the physical hardships of life in the field.

NAMRU-2 was established in Guam during World War II to help combat the devastating effects malaria and encephalitis were having on South Pacific personnel. The headquarters moved to Taipei in 1955, to Manila in 1975, and, finally to Jakarta in 1991, elevating the status of the Detachment that had been established there in 1970. Its laboratories are located in the Indonesian Ministry of Health's Center for Communicable Disease Research where Indonesia and the Navy join hands in fighting major tropical health problems for both their constituencies.

Malaria is the top research priority at NAMRU-2 and has been since its inception. It's not hard to understand why. "Malaria was a show-stopper in

the history of military campaigns," explains CAPT Steve Wignall, a physician and commanding officer of NAMRU-2. "In WWII, annual malaria attack rates in some South Pacific islands were greater than 150 percent! (More than one infection per person per year.) They had no fighting force—they were all sick with or recuperating from malaria."

LCDR Kevin Baird, a NAMRU-2 parasitologist who recently returned to the Naval Medical Research Institute, Bethesda, MD, has studied malaria for years. "It's a very common disease. It comes on very quickly and it knocks you off your feet. It starts with flulike symptoms. Then come chills, fever, vomiting, and malaise that can last for a week or more, even with prompt therapy. So if a soldier or a marine acquires malaria, he's out for 2 weeks at least and often longer. A small but significant percentage develop more severe disease that is associated with a 20 percent fatality rate." Adds CDR Tom Richie, a physician and director of NAMRU-2's



LT P. Todd Korthuis, MC, USNR, aboard USS *Dubuque* (LPD-8) confers with a fellow medical officer on a nearby frigate regarding a possible medevac. Dr. Korthuis, on the NAMRU-2 staff, is conducting research on diarrheal disease and also augmenting *Dubuque*'s medical department while the ship is deployed to Southeast Asia.



NAMRU-2's Anna Maria W. Riberu, a foreign service national employee, conducts research to help combat tropical infectious diseases.

malaria program, "It could easily affect 80 to 90 percent of a battalion, and could happen in a week or two. It's hard to imagine a greater disaster for a military operation than a severe outbreak of malaria. NAMRU-2's role is to help in the development of both vaccines and new medications, and to evaluate the vaccines and the medications so that we know they will work, particularly where there is drug-resistant malaria such as Indonesia."

NAMRU-2's research efforts are divided among several complementary research areas. One is epidemiology, or finding out how and where people become infected, and how to keep the disease from infecting others. As an epidemiologist, LCDR Andy Corwin is often the first person to arrive in the field, conducting surveillance of any existing or potential disease threats. "Reconnaissance is

an important part of any military mission. You don't send personnel into an area and not know what's there; that includes infectious disease. Disease risks may change from day to day and from place to place, particularly as man alters his environment as so often happens in combat."

Diarrhea is a common problem for sailors and marines deployed to Southeast Asia. Besides causing discomfort and embarrassing inconvenience, there are diarrheal diseases that are severe enough to seriously affect operational readiness, and are capable of causing a sudden outbreak. NAMRU-2 is working on a solution. Sailors and marines may work alongside NAMRU-2 researchers aboard ships during port calls in the region, or during exercises like Cobra Gold and CARAT. LT Carlos LeBron is NAMRU-2's head microbiologist. As he describes it, "We have the vac-

cines; they're in the final stages of testing. We want to offer the potential of protection to our sailors and marines first and evaluate the vaccine's efficacy. We've logged literally thousands of WESTPAC deployment miles in the last 2 years in order to determine where the vaccines are most needed." If all goes well, "There will be a combination of vaccines that will be given to sailors and marines to help keep them from getting diarrhea." They may not prevent every case, but NAMRU-2 expects them to be very effective against the most common causes of bacterial diarrhea (*Escherichia coli* and *Campylobacter*) found in this part of the world.

Although NAMRU-2 does not invent vaccines, they contribute significantly to their development. By examining the immune responses of people who are affected by the ma-



CDR Emily Richie, MC, examines the child of a villager in Indonesia whose mother had agreed to participate in a study of a vaccine against life-threatening bacterial meningitis. NAMRU-2 is collaborating with the Indonesian Ministry of Health and the Swiss Serum and Vaccine Institute to conduct this important research.



Navy research microbiologist LT Carlos I. Lebron, MSC, USNR, at work in one of NAMRU-2's infectious disease research laboratories. LT Lebron is working on diarrhea-causing diseases that commonly attack deployed sailors and marines.

laria parasite, NAMRU-2 can learn how the body develops at least partial protection against the disease. NAMRU-2 has a critical role in collecting data which researchers hope could one day help lead to a malaria vaccine. Such a vaccine would have enormous value for military preparedness. But it also has an obvious humanitarian benefit as well. Each year, malaria kills over a million children on the African continent alone.

Malaria and diarrheal disease are not NAMRU-2's only vaccine interests. LTCOL Ross Graham, VC, USA, and his virology department are collecting HIV strains from throughout Southeast Asia, typing them to better map the spread of this dreaded virus through the region, and forwarding them to military HIV vaccine developers in the United States to be sure that any vaccine developed will protect against the many virus types that

exist in the region. Dr. Graham also leads a comprehensive dengue vaccine development program that looks at the epidemiology of the disease in Indonesia and other Asian countries and tries to better understand why some individuals are more severely affected than others.

NAMRU-2's mission to improve the treatment for infectious diseases goes beyond testing drugs and helping to develop vaccines. It led the development of oral rehydration solution (ORS) used for rapidly restoring body fluids to severely dehydrated victims of cholera, reversing what might otherwise progress to an irreversible path to physical decline and death. ORS has saved millions of children's lives since its development 25 years ago. NAMRU-2 also has made major contributions toward the control of hepatitis B, typhoid, cholera, intestinal parasites, and those

dwelling in lymphatics that can cause the horribly disfiguring elephantiasis.

There are 17 Navy and 2 Army personnel assigned to NAMRU-2, augmented by 99 Indonesian professional and technical staff, some of whom have served with NAMRU-2 for over 25 years. NAMRU-2 is itself part of an extensive network of DOD overseas laboratories, operated by both the Army and Navy. These facilities provide a comprehensive disease surveillance capability around the world, monitoring existing diseases, alert to the emergence of new threats. The danger could lie in a new or drug-resistant strain of an old disease or in a deadly and little-known disease that breaks out suddenly and disappears as quickly, like the African Ebola virus. Whatever the bug that attacks, the men and women of NAMRU-2 form a first and important line in our defense. □

Navy Pharmacy Officer:

Training for an Expanded Wartime Role

LCDR Mark E. Brouker, MSC, USN

Since the inception of the Medical Service Corps in 1947, the Navy pharmacy officer has traditionally served a number of important functions in support of Navy medicine's mission of providing medical care to the fleet. Be it as a specialist in medication manufacturing and dispensing, custodian of drug information, or administrators responsible for the entire pharmacy operation, the pharmacy officer has supported Navy medicine's daily mission.

The role of the pharmacy officer has changed dramatically over the past 20 years. As we embark on the process of outlining the future makeup of Navy medicine using tools such as the Total Health Care Support Readiness Requirements (THCSRR) model, I feel it important that *all* roles of the pharmacy officer, i.e., both traditional *and* in an expanded clinical role, be delineated. In this way, accurate pharmacy officer manpower requirements will be established and day-to-day operational and wartime missions met.

During the 1980's, an era of relative peace and stability, the pharmacy officer's role greatly expanded into a variety of clinical areas. At shore-based medical treatment facilities (MTFs) around the world, pharmacy officers routinely interacted with physicians on a daily basis. As the pharmacy officer's clinical skills expanded, both the number and complexity of these interactions increased.

This "peacetime readiness training" evolved into a unique relationship between the physician and the phar-

macist, a relationship built on mutual trust and the desire to deliver the best patient care possible. Physicians came to depend on the pharmacy officer's expertise in areas such as pharmacokinetics monitoring, parenteral nutrition monitoring, critical care and operating room satellite pharmacy support, patient-controlled analgesia, and as members of the cardiac code team.(1) As is the case with our civilian counterparts, direct support in these clinical areas constituted new roles for the Navy pharmacy community (the effectiveness of these new roles resulted in a separate pharmacy subspecialty code—clinical pharmacy, code 1888).

By the end of the 1980's, the role of the pharmacy officer had expanded dramatically. Not only were they needed within the pharmacy spaces to assume such "traditional" roles as administrators and medication manufacturing/dispensing specialists, their clinical expertise was required outside the confines of the pharmacy to assist in direct patient care. In the 1990's, all skills, including their newly acquired clinical proficiency, would be tested under wartime conditions.

With the invasion of Kuwait by Iraqi forces in the summer of 1990 came the first deployment of a Navy pharmacy officer since the Vietnam war. The deployment of the T-AH class hospital ships and combat zone fleet hospitals during Operations Desert Shield/Storm resulted in numerous lessons learned for Navy pharmacy. One very important lesson was the need for a clinical pharmacist in the casualty reception area (CASREC) during mass

casualty evolutions.(2) The effectiveness of a clinical pharmacist in CASREC was again demonstrated during the recent deployment of USNS *Comfort* (T-AH 20) in support of Operation Uphold Democracy. This concept was deemed necessary and readily accepted because medical officers have been trained to depend on the expertise offered by pharmacy officers. Indeed, the presence of a pharmacy officer in CASREC is now standard operating procedure aboard *Comfort* and has expanded to include his/her presence even when only a minimal number of casualties are expected.(3)

During Operation Provide Promise, pharmacy officers attached to Fleet Hospital Zagreb (Fleet Hospital 5 and its predecessor Fleet Hospital 6) used *all* their expertise for the many challenges the health care team met in that unique operational environment. Supporting a multinational force in a war-torn country inherently has major obstacles which dramatically impede patient care—language barriers, foreign medications, lack of health records, foreign infectious diseases, to name just a few.

The probability of a significant “drug misadventure” occurring in such an environment increases dramatically. As such, the importance of the support staff, i.e., pharmacy officers, on the health care team increases proportionally. Indeed, throughout this operation, the pharmacy officers used their clinical expertise to assist all providers, from physicians to independent duty corpsmen, to delivery quality patient care.(4)

In support of each of these operations, pharmacy officers achieved all objectives in their “traditional” roles and also successfully used their clinical skills acquired during peacetime to assist in direct patient care. Indeed, pharmacy officers were an integral part of a health care team that provided the most extensive medical care in support of contingency operations ever delivered in the history of operational medicine. The value of “training in peace to prepare for war” was realized.

Today, in MTFs around the world, pharmacy officers work as administrators, drug information experts, and clinicians to support the day-to-day operational mission of Navy medicine. This continuous “peacetime training” prepares the pharmacy officer to use these same skills to support Navy medicine’s wartime mission. In support of our wartime mission, the pharmacy officer can be assigned to an amphibious assault ship, a hospital ship, or a fleet hospital.

The amphibious assault ships, or casualty receiving and treatment ships (CRTS), are capable of providing advanced medical support to the landing force during amphibious operations. Preferably, patients are on board

less than 24 hours but could remain on board for up to 3 days. The LHA-1 *Tarawa* class has a potential bed capacity of 300 with 17 ICU beds and the LHD-1 *Wasp* class has a potential bed capacity of 600 with 14 ICU beds. The T-AH class hospital ships and combat/communication zone fleet hospitals are designed to be located in a low-threat area providing principle treatment adapted to the condition and needs of the patient. The hospital ships have a potential bed capacity of 1,000 with 80 ICU beds while the combat and the communication zone fleet hospitals each have a potential bed capacity of 500 with 80 and 40 ICU beds, respectively.(5) In addition to such traditional roles as administrators and medication dispensing/manufacturing experts, pharmacy officers will use their clinical skills while assigned to these platforms. Specifically, the pharmacy officer’s clinical expertise in support of the cardiac code team, critical care, and the operating room will be put to the test.

The 21st century promises to be an age of increasingly rapid technological advancement and specialization. In such an era, the role of the pharmacy officer on Navy medicine’s health care team will become even more critical. As we embark on the challenging job of changing Navy medicine to more accurately reflect our readiness responsibilities, the vital role of the pharmacy officer on the health care team needs to be recognized. If we are to follow our “line” counterparts who “fight as they train,” Navy medicine needs to provide health care in support of contingency operations (our wartime mission) just as it provides health care while in training (our peacetime or day-to-day operational mission). Medical officers are *trained* to provide health care with the direct support of pharmacy officers. Medical officers should expect similar support while in an operational environment.

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LCDR Brouker is in duty under instruction pursuing a doctor of pharmacy degree at the University of Rhode Island. He was attached to USNS *Comfort* in support of Operations Desert Shield/Storm and Uphold Democracy.

Dr. Mallory with some of his Tojo mementos including the dowel crown, a 100 yen note with the general's signature, and snapshots of Tojo in Sugamo prison.

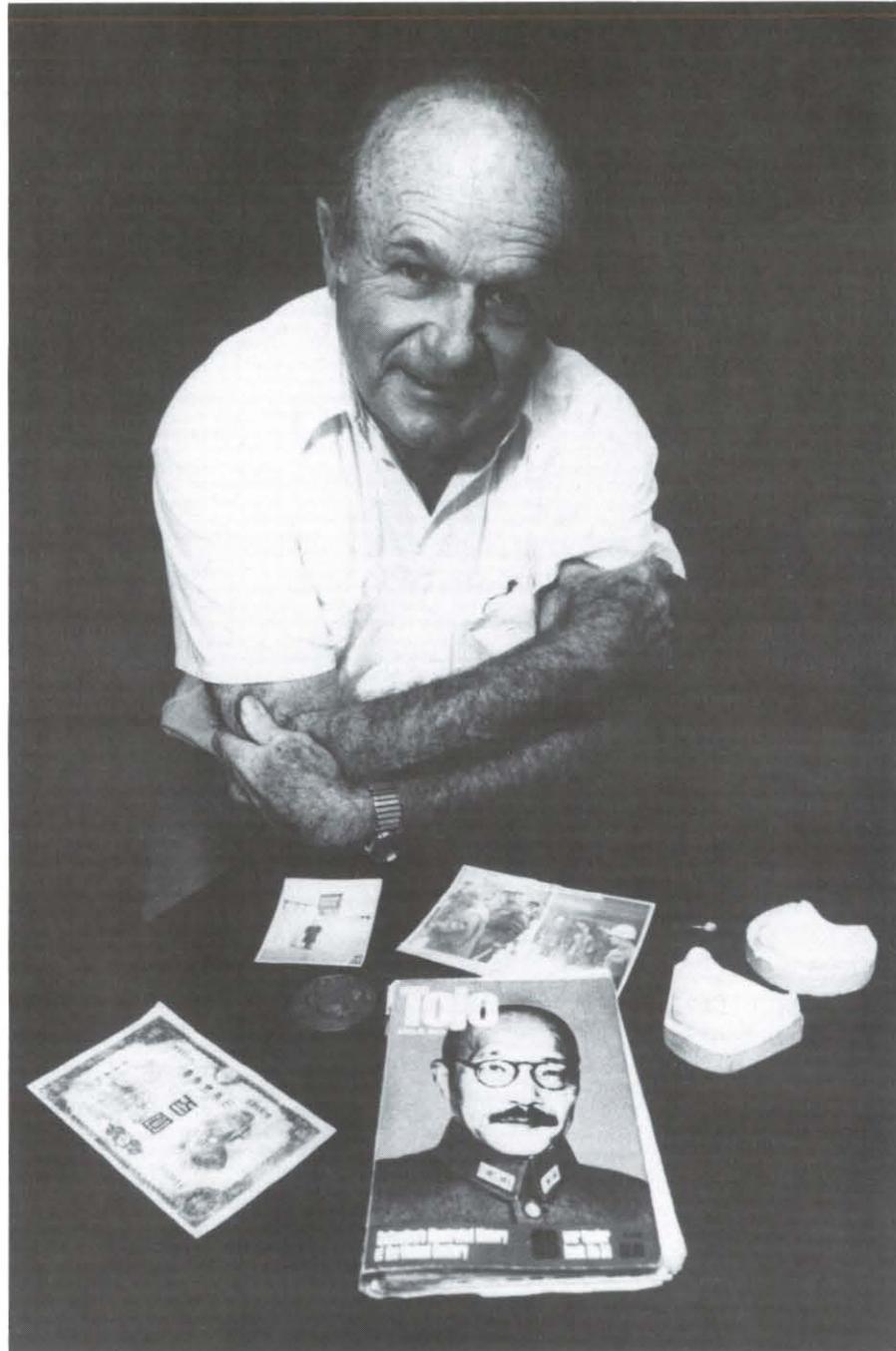
Photo courtesy Dr. Jack Mallory

A Denture for Tojo

Jack Mallory, D.D.S.

In June 1945 I was a brand-new lieutenant (jg), DC, USNR, on active duty serving in a Navy facility in the San Francisco Bay area—Shoemaker Naval Training and Distribution Center. In the summer of 1946, along with about 800 other Navy dentists, I was loaned to the Army because the Navy had a surplus of dentists. Leaving my bride in San Francisco in August that year, I arrived in Tokyo to serve as dental prosthetics officer at the 361st Station Hospital. I not only took care of dental prosthetic needs of the hospital patients and personnel, but also many other military units in and around Tokyo that did not have dental prosthetic departments.

One of my roommates was George Foster, another dentist from Iowa. George was called upon to go to the Sugamo Prison several times a week



to provide emergency services for both military personnel on the staff and the Japanese being held there—some of them the highest governmental figures being tried at the war crimes trial.

A month or so later, George returned one night from the prison to tell us that one of his patients that day had been none other than GEN Hideki Tojo, who was seeking relief from a

toothache.* As things developed, George was going to have to extract all the remaining upper teeth, leaving only seven lower front teeth. He asked if I would go to the prison with him to evaluate Tojo's prosthetic needs. I was naturally excited to be able to see and meet one of the then

*The former Japanese War Minister and Prime Minister was on trial for war crimes following the Japanese surrender.

Right: Dr. George Foster (left) examines Tojo. Note the general's autograph at bottom. **Bottom right:** The gold bridge removed by Dr. Foster prior to the denture's fabrication.

world's most famous (or infamous) persons, probably second only to Adolf Hitler.

We met in the prison's less-than-great dental operatory. Tojo was brought in flanked by two military police guards. The man I met was not the ferocious-looking "Tojo—The Razor" we had seen for so many years in photos and caricatures, but rather a tired, grandfatherly-looking older man. Besides the guards, he was accompanied by his attorney, his personal dentist (where was he when those teeth were rotting away all those years?), and a Japanese interpreter, none of whom were allowed either to touch him or even to be near him.

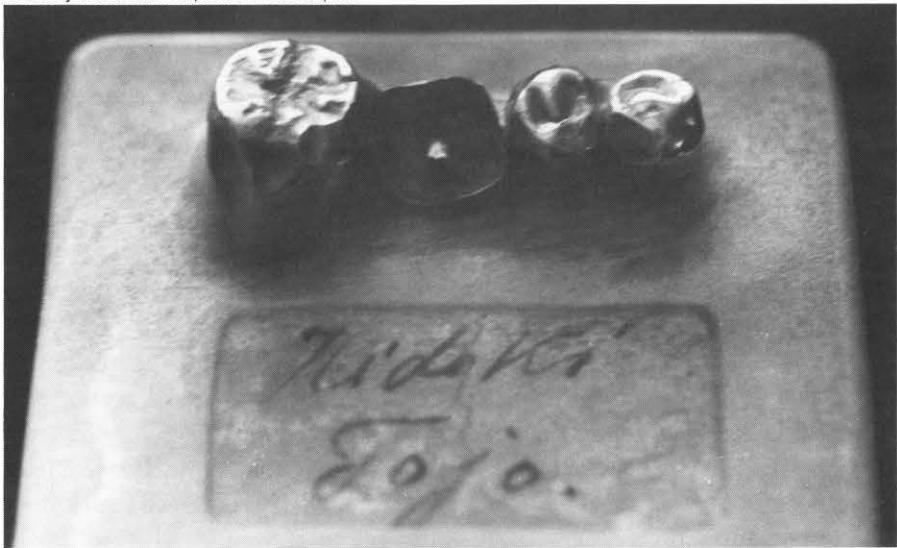
General/Prime Minister Tojo wanted me to make him an upper denture. After evaluating his situation, I informed him that proper treatment procedures would call for the extraction of the very poor remaining lower teeth and then constructing full upper and lower dentures. He pondered my words for a moment and then replied via interpreter, "Oh these will last me 6 more months and after that, my teeth I won't be needing anymore." He said it with a distant look on his face, but in such a way that all in the room—Americans and Japanese—broke into a chuckle followed in a moment by a wide smile from Tojo-san himself.

The making of the denture took a number of visits and several weeks. Tojo was always friendly and cooperative and certainly didn't look like the harsh, swaggering tyrant he had been. Upon completion of his denture and several adjustment visits, my contact with him came to a close. There was, however, a story about his new teeth that, I think, Tojo never knew.

Courtesy Dental Museum, NNDC Bethesda, MD



Courtesy Dental Museum, NNDC Bethesda, MD



In military dental appliance procedures, the name, rank, and serial number of the individual was typed on a piece of paper and embedded under clear plastic in the body of the appliance to serve for ID purposes. Instead, I had a great urge to substitute the famous slogan "Remember Pearl Harbor" in this case, in order for him to chew on it through his final days. Many of the hospital's medical and administrative staff had the same idea and urged me to do so. However,

even at that young age, I had enough brains to know that this would be a mistake from a professional and military ethics point of view. So I refrained from the impulse.

I felt, however, that a compromise was possible. I was an amateur radio operator and knew the international Morse code. I felt that my vengeful urge would be satiated by this compromise: With a round dental drill, inside the circumference of the denture's peripheral border, I in-

This characterization of Tojo in an Oak Knoll Naval Hospital newsletter represented the rage most Americans felt toward the enemy.

NMC Oakland, CA, Archives

scribed in a series of dots and dashes the words "Remember Pearl Harbor."

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.....
.....

And so Tojo wore this inscription in his mouth day and night. The only ones in on this were my dentist roommates and myself, all sworn to secrecy lest George and I find ourselves in deep trouble.

In February 1947 two Baylor University dental classmates of one of our roommates arrived. These newcomers were allowed into the circle to share the secret. We took them on an excursion to the prison to show them our masterpiece. We called the general down to the dental office to examine his denture and see how he was getting along. These newcomers were excited and impressed with our prank on this figure of such world notoriety.

Then, unknown to us, one of these dentists wrote the story to his parents in Texas, whereupon his father passed it on to his brother, who proceeded to retell it on his small town radio station. It was picked up by the news services and reported on radio and in newspapers around the world. An INS (International News Service) reporter in Tokyo called me to arrange an appointment for an interview.

Scared spitless, I fled to my dental commanding officer, MAJ William Hill, and confessed the story, ending my remarks with, "What do I do now?" The situation was a potential public relations nightmare. The war crimes trials were being touted as a showcase of impartial justice. If the story proved true, the credibility of the United States might be impugned, causing international embarrassment.



The major told me to go into hiding and have my staff send the reporter to him, whereupon he denied the story and sent the angry reporter away. That evening MAJ Hill called to ask if we would be able to grind it out of the denture. When told "yes," he ordered us to get our "butts" out to the prison and do so. By then the story was out over the Evening Armed Forces Tokyo Radio Station, WVTR.

George and I commandeered a jeep and drove the approximately 12 miles in a snowstorm to the prison in the Ichigaya District/suburb of Tokyo. We felt like a couple of international operatives. There was no possibility of slipping through the evening silence into the prison cell blocks. It

was St. Valentine's Day and a party was in full swing. We did our best to blend into the crowd in hopes that no serious questions would be raised about what motivated two men to drive through a snowstorm to crash a party uninvited.

We watched for an opportunity to unobtrusively slip out of the party in the opposite direction a departing guest would normally take. The guard on duty at Tojo's cell block was a good friend of George's and, not knowing the real reason, agreed to go to Tojo's cell at 11 p.m., wake the sleeping man, and get his false teeth.

Down in the dental office, I quickly used a grinding stone and removed all traces of the offensive dots and dashes



Dr. Mallory (left) and friend James Wasley.

and crudely made an attempt to polish over the grind marks with limited instruments available in this emergency dental treatment room. The guard took the denture back to the cell and gave it to Tojo. I'm sure the old man wondered until his final day what that was all about, especially considering that the dentures fit far better before our midnight "repair."

The next morning the story appeared in the armed forces *Stars and Stripes* reporting how two Navy dentists had already gotten their revenge on Tojo by inscribing in his denture those words he would most like to forget—"Remember Pearl Harbor." Before breakfast was over, George was called to the telephone. It was the very tough colonel in charge of the prison. The following dialogue is very close to being exact:

"LT Foster!"

"Yes, sir!"

"Have you seen this morning's *Stars and Stripes*?"

"Yes, sir!"

"Is there any truth in this report that 'Remember Pearl Harbor' is inscribed in Tojo's denture?"

"No, sir, there is none."

"Then LT Foster, am I safe to invite the news people to come and see for themselves that it is NOT there?"

"Yes, sir!"

"You are positive about this?"

"Yes, sir!"

"Thank you, lieutenant."

And that was it. I have no idea if he ever invited the press to the prison and so the story ends very anticlimactically. Nothing more was heard. There was only speculation of what might have been our fate had we been "caught with the goods." That, we'll never know.

My tour of service in Japan ended in early summer 1947. I had not yet taken the opportunity to visit the war crime trials, so I chose to do so during my last week there. The trials were presided over by a panel of judges, one from each of the Allied nations: United States, Britain, France, the Netherlands, Australia, China, etc. The president of the tribunal was Sir William Webb on loan from Australia where he was on leave from his position as Chief Justice of their supreme court or its equivalent. During my tour in Tokyo, Sir William had come to me as a dental patient and had

taken a liking to George and me. And so he arranged for me and my friend, Jim Wasley, to sit in reporter's boxes right in the center of the courtroom.

The defendants filed into their box across the room and Tojo was in the center of their lineup about 30 feet from me. I had not seen Tojo for about 6 months. As they sat down, much trivia of a mundane nature was taking place all around the courtroom. Tojo looked all around the room in a bored manner. This trial had been going on since early 1946 and would continue until December 1948. At one point, his eyes came to rest on me expressing a puzzled countenance. After what seemed to me to be lengthy scrutiny, his face broke into a big smile. Pointing a finger to his smiling teeth he bowed toward me in a moment of recognition and thanks.

That was the last time I saw Tojo. The trials lasted approximately another 18 months. Near midnight, December 22, 1948, Tojo and several of his cohorts were taken from their cells, first to a small Buddhist chapel where, with manacled hands, they lit sticks of incense. Then, as reports say, he went to the gallows smiling. On his lips was the chant of supplication "to the Buddha of Unlimited Light."

When he died, Tojo was without the denture I had made him. Shortly thereafter, I saw a newspaper article in *The San Francisco Chronicle* accompanied by a photo of Mrs. Tojo kneeling before his shrine in her home. The only identifiable objects in the photo were his trademark horned-rimmed glasses and the "Remember Pear Harbor" denture he wouldn't be needing anymore. □

Dr. Mallory resides in Oroville, CA.

U.S. Navy Dental Corps

Survey of 1994:

Analysis of Narrative Responses

LT Mark J. Bourne, MSC, USN
Susan M. Hilton, M.A.
LCDR Larry Shaw, DC, USN

*F*ollowing recent changes in organizational structure and mission of the U.S. Navy, the Chief of the Navy Dental Corps requested a study of organizational attitudes, perceptions, and outcomes. An anonymous survey was sent to all active duty Dental Corps officers. A total of 915 officers responded to the survey. Content analysis was conducted on the narrative responses to the items asking for the most positive aspects of serving in the Dental Corps and the aspects most in need of improvement. Results indicated that the leading positive aspects of Navy dentistry were professional/social camaraderie, training/educational opportunities, on-the-job professional enrichment, opportunities for travel or particular duty assignments, military/patriotic lifestyle, and Navy-related job conditions. The leading aspects of Navy dentistry identified

most often as in need of improvement were pay, promotion, leadership, Navy policies, shortage of chairside Dental Corps officers, and administrative or collateral duty requirements. Results were assessed as a function of occupational specialty, gender, and rank. This study points to the importance of assessing qualitative information from the membership when defining the issues affecting complex military organizations.

In complex organizations, quality leadership entails the solicitation of membership feedback for problem-solving and problem prevention. The impact from changing conditions on membership attitudes and perceptions is considered highly relevant to the continued success of the organization. To provide such organizational information to the senior leadership of the Dental Corps, the Chief of the Dental Corps requested that the Na-

val Health Research Center (NHRC), San Diego, CA, develop and execute a study to assess organizational issues and outcomes within the Dental Corps.

This is the second organizational study conducted in recent years within the Dental Corps. While the previous study(1,2) (conducted in 1990) examined similar issues, recent changes in the mission and force structure prompted a reexamination of the relevant organizational issues within the Dental Corps. The assessment in this report will be based on the narrative-response portion of the survey conducted in 1994.

Methods

Sample

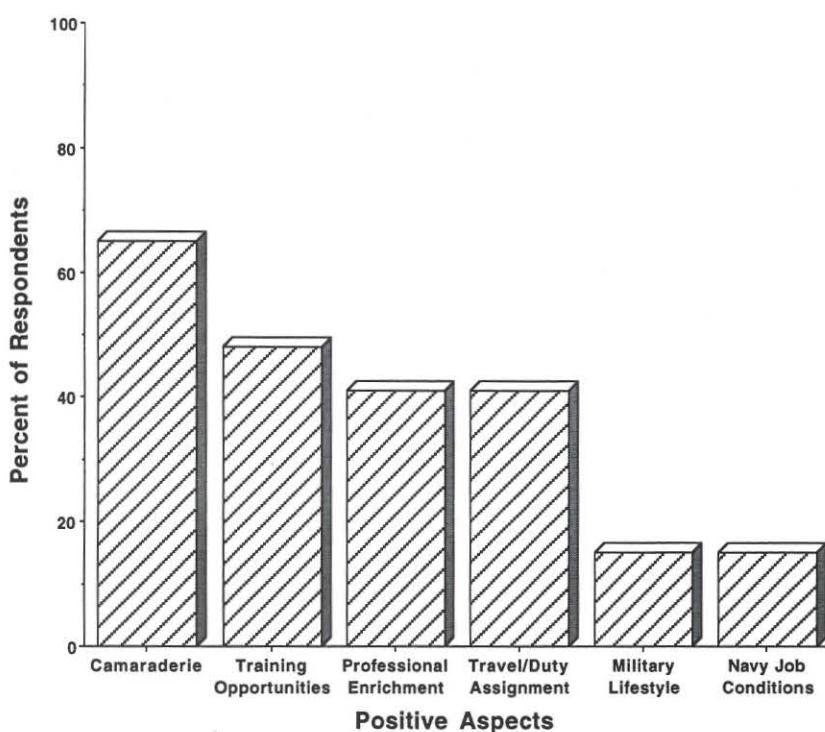
An anonymous survey was mailed to all active duty Dental Corps officers (N=1,444). A total of 915 officers (63 percent) responded to the

Table 1
Demographic Summary
Population N = 1,444*
Survey N = 915 (63%)

Designator			Rank			Gender		
	<u>Pop %</u>	<u>Sample %</u>		<u>Pop %</u>	<u>Sample %</u>		<u>Pop %</u>	<u>Sample %</u>
2200	69	76	LT	33	27	Men	87	89
2205	31	24	LCDR	33	33	Women	13	11
Age			CDR	18	20			
<u>Pop %</u>			CAPT	15	20			
Mean			RADM	<1	<1			
Std Dev								
Range								
24 - 61	25 - 61							
Race			Pop %			Sample %		
			White	86	91			
			Black	4	3			
			Hispanic	3	3			
			Asian	5	2			
			Other	2	1			

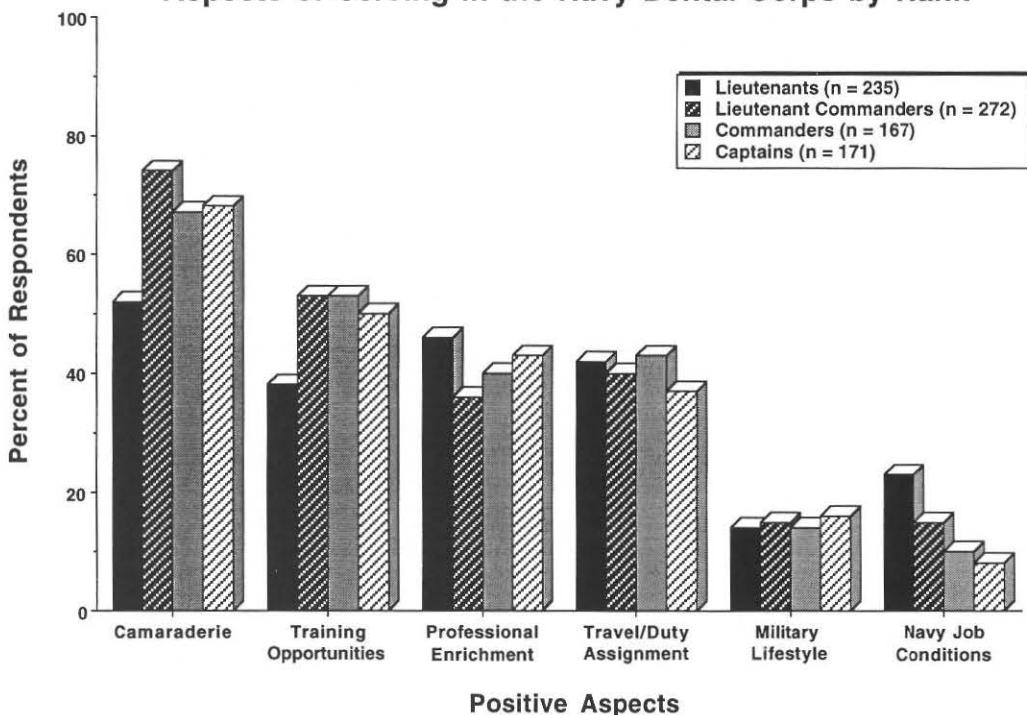
* Population data provided
by LT Todd Allen, Med-06C.

Figure 1
Percent of Respondents Identifying the Leading Positive Aspects of Serving in the Navy Dental Corps



Note: Given multiple response opportunities, values sum to more than 100 percent.

Figure 2
Percent of Respondents Identifying the Leading Positive Aspects of Serving in the Navy Dental Corps by Rank



Note: Given multiple response opportunities per respondent, values sum to more than 100 percent.

survey. As Table 1 indicates, the sample was highly representative of the population of Dental Corps officers on key demographic factors. The distribution of the respondents by subspecialty was as follows: general dentistry (41 percent), comprehensive dentistry (20 percent), exodontics or oral/maxillofacial surgery (9 percent), prosthodontics (9 percent), periodontics (6 percent), endodontics (6 percent), oral medicine/diagnosis (2 percent), operative dentistry (2 percent), and other (5 percent). (The "other" category represents subspecialties with too few respondents for reliable analyses by subspecialty.) Approximately 57 percent of the sample had received a 1-year program of advanced education (e.g., general practice residency, advanced

clinical program) and 42 percent had participated in a 2-or-more-year program (e.g., residency).

Procedure

Based on input from the Chief of the Dental Corps, the contents of the 1990 survey, and standardized organizational measures, a 250-item survey was constructed to assess background information, career profile, turnover intent, and perceptions and attitudes regarding a number of Dental Corps issues. To enhance both objective assessment and comprehensive coverage of Dental Corps issues, both quantitative items, using Likert-type rating scales, and qualitative items, using semistructured narrative responses, were included. All anonymous narrative responses were de-

tached from the survey, photocopied, and forwarded to the Chief of the Dental Corps. Due to space limitations, only the results from the narrative responses will be presented in this article.

Results

Positive Aspects. Results of analyses of responses to the most positive aspects of serving in the Dental Corps are presented in Figure 1. Appreciation for professional/social camaraderie (65 percent) was expressed in terms of esprit de corps, supportive coworker attitudes, competent coworkers, consultation accessibility, lasting friendships, and other expressions of both professional and social support. Expressions of appreciation for training/educational opportunities

Table 2
Percent of Respondents Identifying the Leading Positive Aspects of Serving in the Navy Dental Corps by Subspecialty

SUBSPECIALTY	LEADING POSITIVE ASPECTS					
	CAMARADERIE	TRAINING OPPORTUNITIES	TRAVEL/DUTY ASSIGNMENT	PROFESSIONAL ENRICHMENT	MILITARY LIFESTYLE	NAVY JOB CONDITIONS
GENERAL DENTISTRY N = 630, n = 343	61	38	44	44	15	20
COMPREHENSIVE DENTISTRY N = 265, n = 175	69	49	37	43	17	11
ORAL/MAXILLOFACIAL SURGERY N = 148, n = 73	73	64	40	30	12	11
PROSTHODONTICS N = 129, n = 78	72	56	36	35	9	9
PERIODONTICS N = 88, n = 49	69	67	45	39	6	18
ENDODONTICS N = 86, n = 47	77	60	38	30	15	9
ORAL MEDICINE/DIAGNOSIS N = 21, n = 12	75	67	50	33	17	17
OPERATIVE DENTISTRY N = 20, n = 13	62	62	8	46	8	0
OTHER N > 72, n = 39	51	51	33	49	28	15

Note: Totals sum to more than 100 percent due to multiple response options.

(48 percent) included referents to the quality of professional training, the value of officer training, access to continuing education, support in pursuing a specialty residency, and the opportunities for specific training programs. Professional enrichment expressions (41 percent) included concepts of variety (e.g., leadership opportunities, multiple career pathways, clinical rotation opportunities), challenge (e.g., personal growth, professional growth), and working conditions (e.g., opportunities not available to civilians, job satisfaction, job enjoyment, recreational activities). Travel opportunity/duty assignment appreciation (41 percent) encompassed the rewards of cultural exposure, operational tours, shipboard experience, overseas life, specific duty

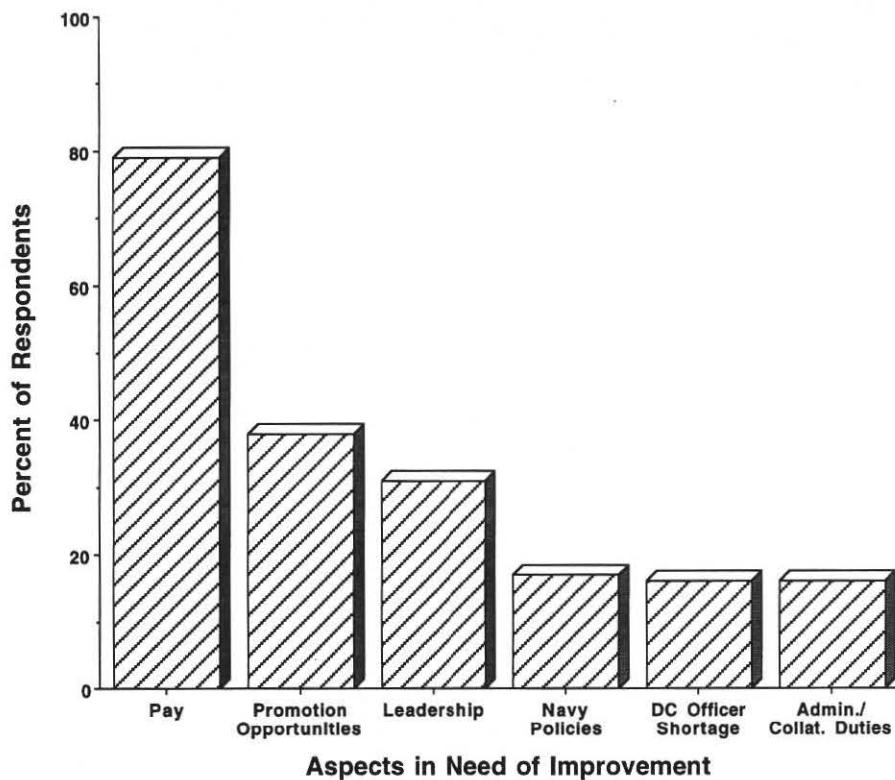
stations, and being "on the move." Military lifestyle appreciation (15 percent) was reflected by comments about service to the country, support of our fighting forces, pride in the uniform, or dedication to the Navy or the Dental Corps. The Navy-related job conditions (15 percent) that were specified included absence of malpractice and overhead expenses, a ready patient population, freedom from payment-collection concerns, provision for sick leave and vacation time, and the opportunity for early-age retirement.

An inspection of the rank order of the response percentages of the positive aspects by military rank (Figure 2) indicated a general consistency across rank. Deviations involved adjacent categories except for lieuten-

ants. Lieutenants identified both camaraderie (52 percent) and training opportunities (38 percent) less frequently than did the other military ranks, but identified professional enrichment (46 percent) and Navy job conditions (23 percent) more frequently.

Table 2 presents response percentages for the leading positive aspects of serving in the Dental Corps by subspecialty. While general consistency was exhibited in the rank ordering of leading aspects across the subspecialties, more periodontists and oral diagnosticians identified training opportunities than the other subspecialties. General practitioners identified training opportunities less often while ranking on-the-job enrichment relatively high. Oral diag-

Figure 3
**Percent of Respondents Identifying the Leading Aspects
 in Need of Improvement in the Navy Dental Corps**



Note: Given multiple response opportunities, values sum to more than 100 percent.

nosticians identified travel/duty assignments the most frequently, while operative dentists identified it the least, creating the greatest difference (42 percent) between categories.

Aspects in Need of Improvement. The leading aspects of the Dental Corps identified as needing improvement (Figure 3) were pay (e.g., inadequacies, inequities, need for debt relief; 79 percent), promotion (e.g., restrictions, inequities; 38 percent), and leadership (e.g., quality, quantity, style, structure, total quality management [TQM] implementation, performance evaluation; 31 percent). Aspects identified less frequently included: (a) current Navy policies (e.g., regarding civilian contractors,

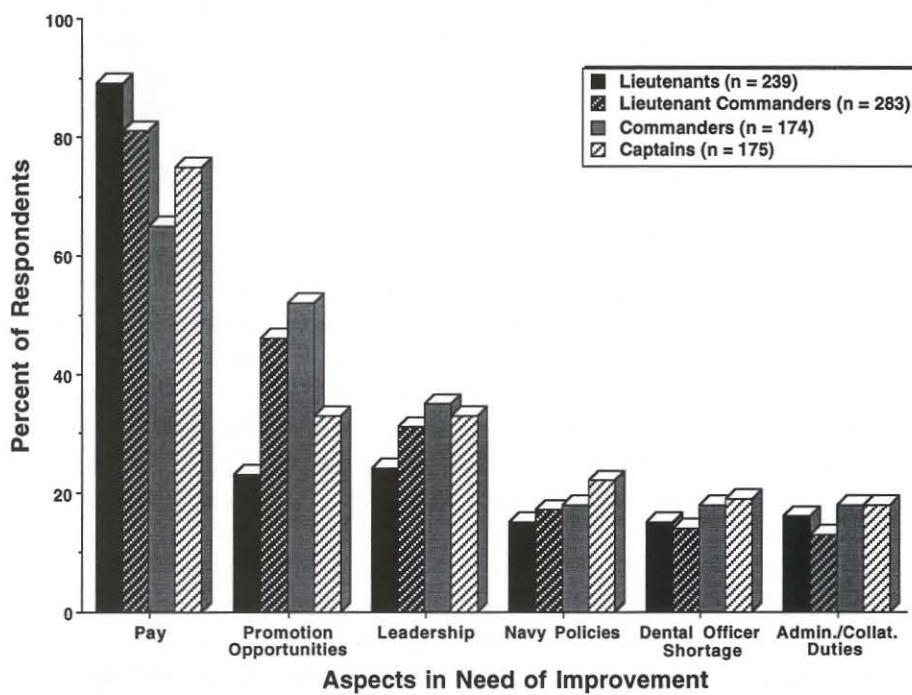
military budget allocations, the Defense Officer Personnel Management Act [DOPMA], equal opportunity practices, Dental Corps autonomy; 17 percent), (b) the shortage of chairside Dental Corps officers (16 percent), and (c) the excess of administrative or collateral-duty requirements (16 percent).

Although the rank ordering of response percentages for the leading aspects in need of improvement are generally consistent across rank, interesting differences appear to exist (Figure 4). Lieutenants, for example, tended to emphasize pay more often (89 percent) than did other ranks. This is likely related to educational debt, which, for lieutenants, is an average

of \$48,999. Additionally, lieutenant commanders (46 percent) and commanders (52 percent) appear to be more concerned with lack of promotion opportunities than are lieutenants (23 percent) or captains (33 percent).

Oral surgeons, endodontists, and operative dentists identified pay issues more frequently than the other subspecialties (Table 3). More oral diagnosticians identified chairside staffing shortage (ranked 3rd at 53 percent), promotion opportunity, and, along with periodontists, administrative/collateral-duty requirements. Oral diagnosticians identified leadership issues less than other subspecialties.

Figure 4
Percent of Respondents Identifying the Leading Aspects in Need of Improvement in the Navy Dental Corps by Rank



Note: Given multiple response opportunities per respondent, values sum to more than 100 percent.

Table 3
Percent of Respondents Identifying the Leading Aspects in Need of Improvement in the Navy Dental Corps By Subspecialty

SUBSPECIALTY	LEADING ASPECTS IN NEED OF IMPROVEMENT					
	PAY	PROMOTION OPPORTUNITY	LEADERSHIP	NAVY POLICIES	DENTAL OFFICER SHORTAGE	ADMIN./COLLAT. DUTY REQUIREMENTS
GENERAL DENTISTRY N = 630, n = 351	83	31	28	15	15	18
COMPREHENSIVE DENTISTRY N = 265, n = 175	72	46	32	26	17	14
ORAL/MAXILLOFACIAL SURGERY N = 148, n = 77	88	40	25	17	21	10
PROSTHODONTICS N = 129, n = 80	75	41	31	19	14	14
PERIODONTICS N = 88, n = 50	66	40	42	12	16	22
ENDODONTICS N = 86, n = 52	85	52	40	10	17	13
ORAL MEDICINE/DIAGNOSIS N = 21, n = 15	80	60	13	13	53	20
OPERATIVE DENTISTRY N = 20, n = 13	85	31	31	23	8	0
OTHER N > 72, n = 41	73	46	37	17	15	17

Note: Totals sum to more than 100 percent due to multiple response options.

Discussion

The results of this survey strongly echo the 1990 results, wherein camaraderie, training opportunities, professional enrichment, and travel opportunities were also the leading positive issues. This replication of results indicates that these four aspects of the Dental Corps are still available and are well appreciated by Dental Corps membership.

However, there are also some apparent differences between the results obtained in the present study and the study conducted in 1990. Specifically, under the leading positive issues, the percent with which the quality of delivered care was cited decreased from 20.5 percent in 1990 to 11.0 percent in 1994. This decrease may reflect a drop in relative satisfaction and/or relative personal importance. Other noteworthy changes occurred under the leading aspects in need of improvement. The percent of respondents indicating dissatisfaction with enlisted staffing (19.6 percent) and dissatisfaction with the competence of enlisted staff (14.7 percent) reported in 1991 decreased to 8.0 percent and 9.0 percent, respectively. This decrease in the percent of dissatisfaction would appear to be a positive change in the area of support staff. With regard to the current study, the stronger emphasis on Dental Corps officer shortage and on Navy policies suggests a shift in concerns that may warrant closer examination.

Clearly, the overriding issue for Dental Corps officers continues to be pay—the only issue targeted by a majority of the respondents in 1990 (52 percent) and again in 1994 (79 percent). Furthermore, the substantive jump in the proportion of respondents specifying pay concerns identifies it as a growing problem. The tone of the responses that elaborated on pay objections ranged from resent-

ment over perceived inequities, especially vis-a-vis civilian counterparts or Medical Corps officers, to frustration, to anger, and to despair from feeling overwhelmed by education-load debt. Many comments requested increases in salaries, bonuses, professional pay, or specialty pay, or recommended an effective loan deferment program.

Also continuing to be a critical issue for Dental Corps officers is promotion opportunity. It is the second leading issue again, as identified by 39 percent of respondents in 1990 and 38 percent in 1994. Respondents expressed concern in terms of restricted promotion opportunities, insufficient objectivity in the evaluation process, and overemphasis on nonclinical criteria. In today's Navy, failure to get promoted may result in involuntary loss of military employment. The 1990 analysis, which included narrative responses regarding the primary reasons for one's career intent, identified pay or lack of promotion opportunity as the primary reason for intent to separate from active duty for 53 percent of lieutenants and lieutenant commanders. That these two leading issues are so removed from the direct control of Dental Corps leadership all but forces the recourse to creative problem-solving in addressing them.

Leadership, the last of the notable leading issues for improvement, grew from a concern for 18 percent of 1990 respondents to 31 percent of 1994 respondents. More so than most, this category of response captured many overlapping concepts, some of which were deliberately segregated, namely into categories for dissatisfaction with morale, recognition/support, or career guidance. Not segregated were concepts specifying dissatisfaction with TQM implementation, with evaluation implementation, with top-heavy leadership structure, and with

perceived quality or competence of leaders, especially in terms of supplying appropriate communication, being positive role models, delegating authority, exercising objectivity, practicing fair treatment, and promoting teamwork. All combined, 44 percent of the respondents targeted these leadership concepts with the following breakdown of overlapping concepts: morale, 4 percent; recognition/support, 14 percent; career guidance, 6 percent; TQM, 3 percent; performance evaluations, 11 percent; all others, 21 percent. (Note that due to multiple response opportunity, these figures are not strictly additive.) Hence, the encompassing nature of leadership contributes to its high response rate.

The results of this study provide an assessment of the perceptions and attitudes of Dental Corps officers. The method allowed Dental Corps officers to define organizational issues from their viewpoint. They identified camaraderie, training opportunities, professional enrichment, and travel opportunities as particularly rewarding aspects of naval dentistry. They also identified pay, promotion, and leadership as leading concerns. Their feedback can serve as valuable information to Dental Corps leaders tackling policy evaluation, issue identification, and organizational planning.

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2. Nice DS, Tarquinio G, Hilton SM. Results of Dental Corps officer survey. *Nav Med*. 1991;82(6):26-30. □

LT Bourne is a research psychologist at the Naval Medical Quality Institute, Bethesda, MD. Ms. Hilton and Dr. Shaw are on the staff of the Naval Health Research Center, San Diego, CA.

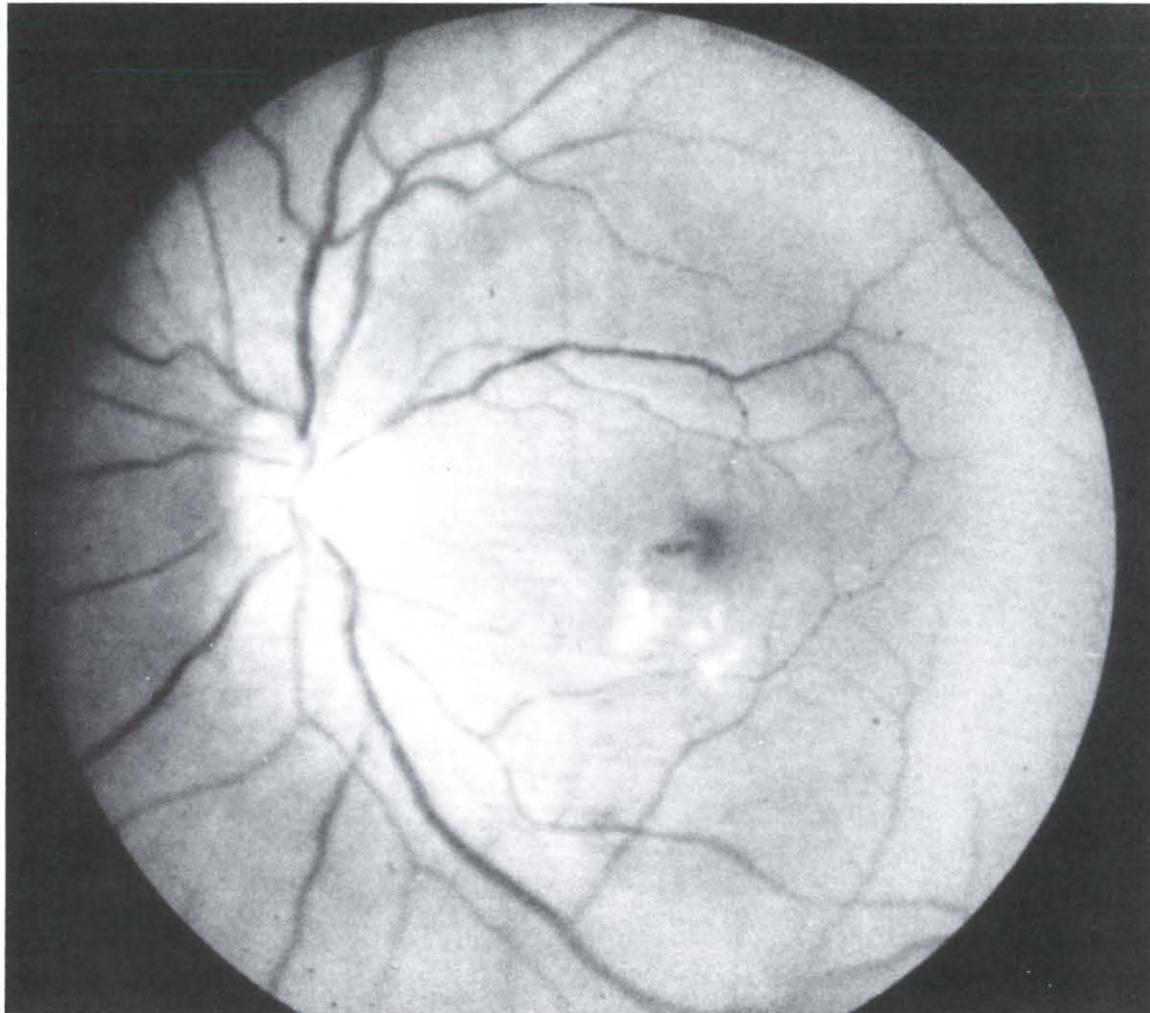


Photo 1. Patient's
eye on 14 June
1994

Laser Injury

LCDR Gregory M. Gorsuch, MSC, USN

On 5 June 1994 a Marine Corps weapons company prepared to depart for laser safety and employment training at Marine Corps Air Ground Combat Center, Twentynine Palms, CA, but was delayed by vehicle problems. The weather was hot, about 100 degrees F, and sunny. At approximately 1400, while the main body of the company staged on a grinder, the platoon laser supervisor, a first lieutenant, used the delay to connect an AN/GVS-5 laser range finder, to his

HMMWV's battery with the power adapter cables. His driver, a lance corporal, was assisting.

The lieutenant connected the adapter to the battery terminals, while the corporal inserted the other end into an AN/GVS-5, holding the unit with his thigh against the HMMWV. The lieutenant returned to the vehicle to examine the connections.

With the device about 2 feet from his face, the "fire" button against the vehicle, and the beam portal facing him,

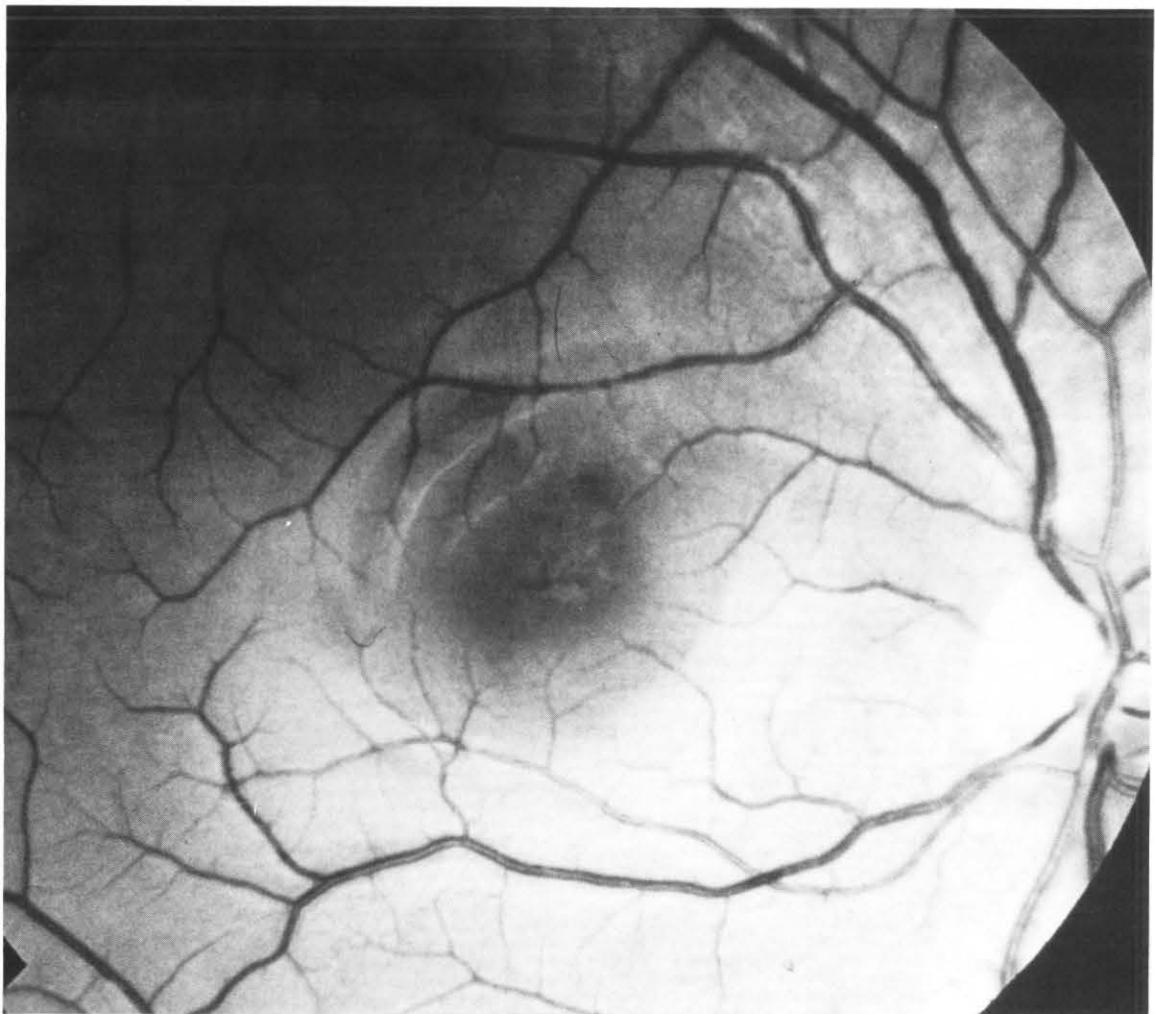


Photo 2A. On 18 Nov 1994 retinal images show the patient's vision improved in the left eye and in 2B (opposite page) the extent of damage in right eye.

the corporal removed the beam portal lens cap and "a bright flash came from the lens." Momentarily startled, the corporal picked up the device to see if there was power.

When the lieutenant turned around, the corporal had the range finder to his eye with the laser pointed down range as if he were sighting in. The lens cap was off with his finger on the fire button, and the laser was pointed in the direction of a chow hall.

The lieutenant instructed the corporal to put the laser down and place the lens cap on the laser. The corporal responded that it was "OK" because the power switch was off. The lieutenant confirmed this but took the device out of the corporal's hands and warned him not to point down range, especially while still in rear areas.

The lieutenant then turned the power switch on, pointed the laser down toward the passenger side of the HMMWV, and pressed the "min range" button to check the power. There were no numbers, nor was there a low-battery

indication. He decided there was no power. The corporal then noticed that the two connectors of the adapter were on the negative terminals on the batteries. After removing one connection, touching it to a positive terminal the "min range" setting checked. At this time, the laser was receiving power. Shortly after disconnecting the cables and stowing the unit, they departed to the field.

The corporal noticed severe eye irritation immediately after the flash and could not clear his vision. Everything was very blurry and he saw "in splotches." Feeling it was unnecessary to inform anyone of these problems, he thought his vision would clear such as after seeing a flash bulb go off.

After 5 hours the corporal still felt discomfort in his eyes and informed a corporal in his platoon. The corporal advised him to sleep on it and see how things looked in the morning.

The following morning his vision was still "very

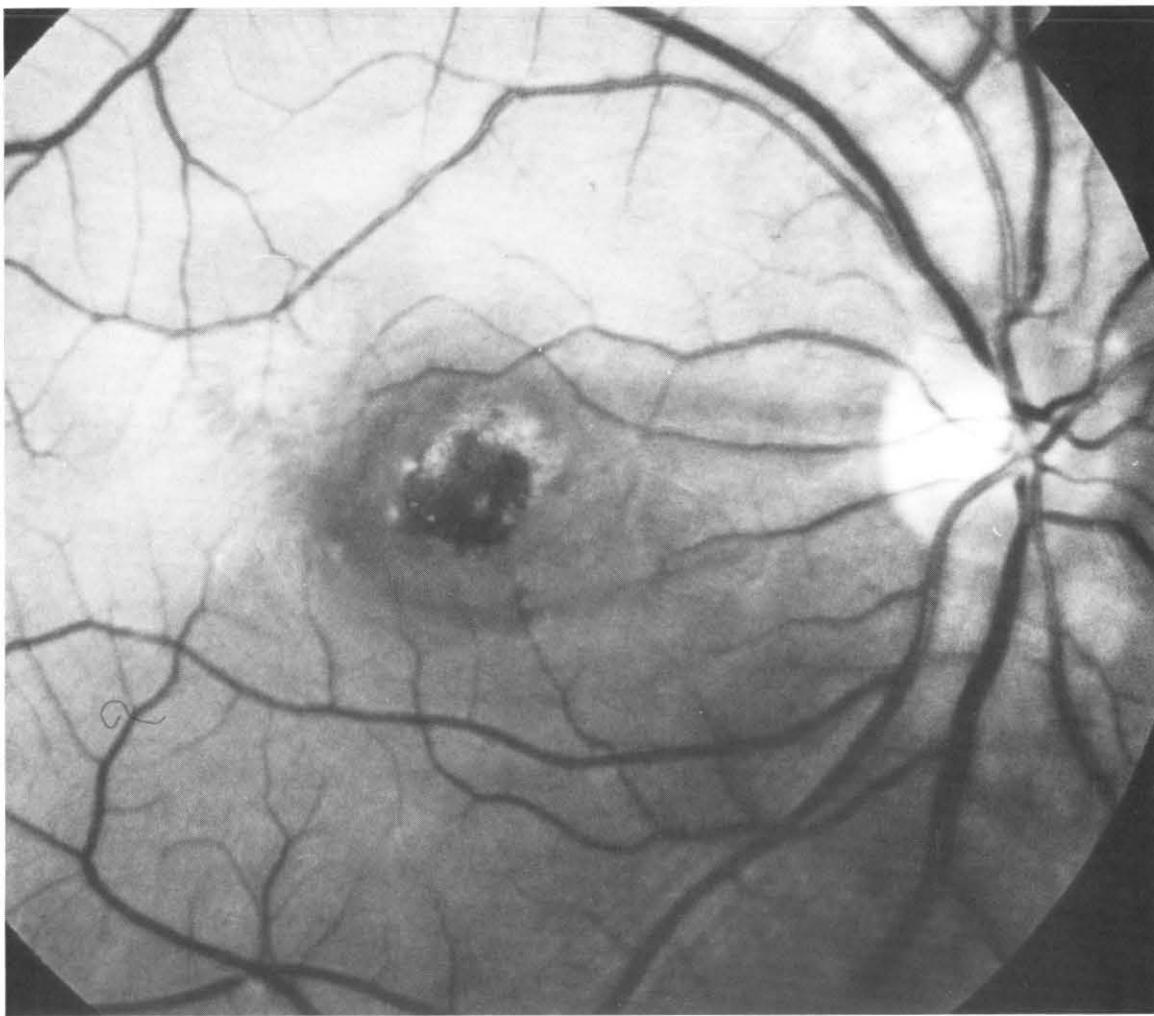


Photo 2B. U.S. Army Medical Research Detachment, Brooks Air Force Base retinal image shows the extent of damage to patient's right eye.

blurry." After hearing this, a staff sergeant went to the lieutenant to discuss the eye complaints. The lieutenant then asked the corporal whether he ever had eye problems before, or if he had been looking at the sun. He then concluded that the laser did not cause the visual problems, especially after they had problems powering the device.

Later that day, the corporal drove off the road after being "almost completely" blinded by the sun's glare. After this incident, the lieutenant sent him back to have his eyes checked. The corporal arrived at the rear at about 2300 and found the battalion aid station (BAS) closed.

The following morning the BAS physician examined the corporal and noted that his vision was 20/50 in his right eye and 20/200 in his left, but otherwise noted no abnormalities. A referral to the eye clinic at the Twentynine Palms Naval Hospital found the earliest nonemergent appointment available was 6 days later.

On 13 June an optometrist at the hospital saw the

corporal but noted nothing abnormal until he dilated the patient's eyes. He observed macular hemorrhages, edema, and other retinal hemorrhages in the right eye, and an irregular macula with fewer hemorrhages in the left eye. His diagnosis was retinal complications from laser exposure. He was examined the following day by the ophthalmology department at Naval Medical Center (NMC) San Diego, CA. At NMC the examining physician also assessed the situation as laser injuries bilaterally (see cover and Photo 1).

The NMC and the Laser Hazards Research group of the U. S. Army Medical Research Detachment at Brooks AFB, the DOD center for evaluation of suspected laser injuries, saw the corporal on multiple occasions. The patient's vision improved in the left eye as the blood dissipated, while the vision in the right became increasingly worse as scarring took place and edema developed below the retinal surface (see Photo 2A and 2B).



Photo 3. The AN/GVS-5 laser range finder involved in the incident.

In December a medical board gave him the option of undergoing a potential surgical repair of his right eye. He underwent a vitrectomy on 6 Jan 1995. When seen in July, left eye vision remained the same, with some degradation of color vision, while right eye vision deteriorated to 20/800. The corporal received a medical discharge from the Marine Corps shortly after this evaluation.

The Laser

The AN/GVS-5 is an infrared laser observation device that accurately determines distances between the operator and selected targets (i.e., a range finder). It has been a standard part of the U.S. Army inventory for about 15 years. The U.S. Marine Corps adopted the AN/GVS-5 in the mid-1980's. It contains a Q-switched Neodymium YAG (1064nm wavelength—invisible to the naked eye) laser transmitter. The device is about the size and weight of a standard pair of binoculars, with a large “lens” on one side and a relatively flat surface on the side of the laser exit (see Photo 3). The unit operates on a rechargeable battery, with battery adapter cables as a backup. The original safety features included two filters for use when personnel were within certain nominal ocular hazard distances (NOHDs), and a standard laser warning label.

From a safety standpoint, this mishap was clear-cut. Mishap analysis revealed human factors, specifically the injured corporal and his immediate superior, as the largest contributor to the accident. The lieutenant's primary error was failing to supervise an untrained individual assisting

him in a technical task. He left the laser range finder unattended, turned his back, failed to instruct his subordinate in its use, and any prohibited actions, and failed to point out the considerable safety hazards inherent in handling the AN/GVS-5.

The injured corporal was not without responsibility in this mishap. He failed to obey clearly labeled warning instructions and he did not request clarification from his superior on the nature of the task.

Contributing to the mishap was the general lack of understanding of the physical signs and symptoms of a laser eye injury. This chain of events began with the corporal himself, who shrugged off the injury thinking the spots before his eyes would “go away.” The senior enlisted and lieutenant suspected malingering and delayed referral to the BAS for 2 days. The BAS physician compounded matters by assessing the injuries as “flashburns OU” and referred him to followup at the eye clinic 6 days later.

Despite the obvious human factors, mechanical factors were partially to blame for this mishap. A thorough systems analysis of the laser involved in the mishap concluded that the device will “laze” in the orientation described in the mishap. However, the power switch must be on. The device will not produce another beam unless the fire button is disengaged. However, if the power is disconnected and reconnected it will reset in the same way as releasing the fire button producing laser beams every 0.7 seconds.

This accident is the first fully documented Marine Corps laser eye injury. The most immediate result of this accident was the issuance of Marine Corps Order (MCO), 5104.1 Marine Corps Laser Hazards Control Program. Some specific lessons learned issued immediately after the accident included:

- Instruct all persons granted access to class 3b and 4 lasers, before access, to recognize and obey the laser warning symbols and instructions on the device.

- Immediately disseminate lessons learned from laser accidents and system safety modifications for fielded lasers.

- Physical signs (symptoms) of laser eye injuries may not be readily apparent. All suspected or observed laser eye injuries require immediate competent medical evaluation.

- Fear of retribution for misconduct or poor leadership delays discovery of mishaps and subsequent corrective actions. Placing priority on legal considerations over safety investigations leads to delays in timely dissemination of hazard information, with no value added.

- A thorough system safety analysis of all class 3b and 4 lasers before fielding is necessary.

Lessons for Medical Care

There is also a primary lesson for Navy medicine in this mishap. The physical symptoms of laser eye injuries may not be dramatic, and that the mere suspicion of a laser eye injury requires quick and competent medical evaluation. Training in the recognition of laser injuries and their treatment is not routine, with expertise usually found in the fields of ophthalmology and optometry. Symptoms will vary depending upon the location and severity of the injury. Without obvious lesions, such as skin and corneal burns and/or retinal burns and retinal hemorrhages, careful histories may assist in connecting the injury to a laser exposure. Histories of experiencing glare, flashblindness, decreased vision, pain, or any combinations are suspect. Later complaints of after-images, blurred vision, photophobia, pain, or frank loss of vision, again, may suggest laser injuries.

Besides medical histories, physical examinations that assist in the diagnosis of laser eye injuries include a thorough external examination, Snellen acuity, confrontation visual fields, Amsler Grid, evaluation of stereopsis, and ophthalmoscopy. These routine examinations, along with special examinations and medical history questionnaires, help confirm suspected laser injuries.

The concept of medical surveillance, providing a baseline retinal evaluation prior to working with hazard-

ous lasers has been of benefit in confirmation of laser injuries. However, given the time and expense associated with these examinations, only those individuals "routinely" working with lasers warrant inclusion in the program. Most personnel within the Marine Corps, classify as "incidental" workers, requiring only a visual acuity check.

The treatment of laser injuries remains conservative. Treatment of corneal burns (largely from UV light sources) is the same as for burns of other etiologies: antibiotics and dressings. Treatment of retinal and choroid injuries is not "well-defined." Early intervention/evacuation of laser eye injuries as well as application of ocular and oral corticosteroids or basic fibroblast growth hormones remain largely controversial.

The rarity of laser injury reports belies the common use of lasers within the military. Many units within the Marine Corps have lasers capable of injuring the eye, and they are becoming increasingly more common as lasers become smaller and less expensive.

In the past the time and expense of development and acquisition of military laser systems allowed considerable input from safety design engineers and the LSRB prior to the fielding. The low number of reported laser injuries is a direct result of prudent design and safety procedures, as well as the Navy's medical surveillance program. With the advent of powerful laser diodes smaller than a dime and changes in government policy on use of military standards and acquisition of "off the shelf" technology, items of questionable quality, origin, and safety have already made their way into the hands of Marine Corps units. The incidence of laser injuries will only increase with availability and low perception of risk—borne from years of use without significant injuries. □

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Naval Medical Research and Development Command Highlights

●USS *Reliance* Christened at Brooks Air Force Base

High-frequency (HF) energy is transmitted from various shipboard antennas. Antennas are sometimes located near catwalks and occupied workstations aboard ship. On aircraft carriers antennas near the flight deck are rotated to the horizontal position during flight operations. Sometimes, aircraft are parked directly over the antennas during transmission. For some HF frequencies and aircraft, the energy is strongly transmitted and hand-contact can result in very large current flow in the body. To study these situations, the Navy and Air Force built a 60-foot by 60-foot antenna and ground plane transmission system that simulates an aircraft carrier deck. This simulated deck, christened the USS *Reliance* at Brooks Air Force Base, TX, will allow researchers from the Naval Medical Research Institute Detachment at Brooks to study the health and safety aspects of radiofrequency transmission-induced body and contact currents. The research detachment received tentative approval from Commander, Naval Inventory Control Point Philadelphia, PA, for the use of an A4C *Skyhawk*. The aircraft will be used in current research projects and will be used on the ground plane near a high-power transmitting antenna in the high-frequency band 2-30 MHz. A full-sized human model will be positioned near the aircraft during transmission; both hand-contact current and body-to-ground current will be measured in the human model for many common conditions of ordinance handling and aircraft orientation relative to the antenna. Future use of an F/A-18 was also approved. With aircraft, the carrier-deck simulation is greatly improved and the results can be directly applied to the fleet.

●NAMRU-3 Celebrates 50 Years

With sailors and marines deployed around the world, mission-specific medical research on infectious diseases continues to be one of the Navy's highest priorities. Deployed personnel can be exposed to endemic diseases, many of which are rarely, if ever, encountered by physicians in the United States. The Navy has

developed a series of strategically located overseas laboratories to train infectious disease specialists, study disease threats, and act as a platform for testing drugs and vaccines against various infectious diseases. The Naval Medical Research Unit No. 3 (NAMRU-3) in Cairo, Egypt, was the second laboratory the Navy established overseas. For the past 50 years NAMRU-3 has studied numerous tropical and subtropical diseases, including enteric diseases, malaria, schistosomiasis, acute respiratory infections, tuberculosis, Q-fever, brucellosis, filariasis, leishmaniasis, meningitis, hepatitis, typhoid fever, parasitic diseases, tetanus, cholera, Rift Valley fever, and AIDS. NAMRU-3 personnel were forward deployed for Desert Storm and Desert Shield, and they continue to provide support to fleet assets for multiple exercises, such as Operation Restore Hope and Operation Bright Star.

As a recognized leader in infectious disease research, NAMRU-3 has affiliations with over 42 major research, clinical, and health organizations throughout the world. These include numerous universities; international and U.S. agencies such as the World Health Organization, the Centers for Disease Control, U.S. Agency for International Development, Veterans Administration, the National Research Council, the Multinational Forces and Observers; various foundations such as the Fulbright Foundation; and the Ministries of Health in Egypt and other countries such as Djibouti, Ethiopia, Yemen, Saudi Arabia, Kuwait, and Syria. NAMRU-3 is a well-respected institution in Cairo and has acquired a significant degree of trust and acceptance in this region. The technologically advanced facilities, the access to acutely infected patients in the Abbassia Fever Hospital, and the community-based longitudinal study sites with established field laboratory capabilities make NAMRU-3 a valuable DOD resource as we move into the 21st century and begin a second 50 years in Egypt.

For more information on these and other research efforts contact Doris M. Ryan, Deputy Director, External Relations, at DSN 295-0815, Commercial 301-295-0815, FAX 301-295-4033, or E-mail ryan@mail9w.nmrdc.nnmr.navy.mil.

Navy Medicine 1944



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Oral surgery, Division Dental Clinic, 2nd Medical Battalion, 2nd Marine Division, Saipan

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